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SCIENCE AS A TEACHER OF MORALITY¹

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The subject does not imply that science is professedly a teacher of morality, but that incidentally it makes for righteousness. It would be comparatively simple to select from its contributions to knowledge many that have strongly enforced the necessity of morality; or to point out that its conception of the inevitable consequences of acts has shown that results are a matter of course rather than of chance. To my mind, however, valuable as these contributions may be, they are but superficial indications of an attitude of mind which represents the chief contribution of science to morality. To give a clear conception of the relation of this attitude of mind to morality is difficult, for it is somewhat intangible, and to a certain extent prophetic; but to me it seems to be the most important phase of the subject.

It should be further understood that the subject does not imply that science can replace religion as a teacher of morality; but that, in so far as it contributes anything to morality, it reinforces religion.

"Science" is a term of convenience rather than of exactness, and hence I must state at once that in this paper it means what is called "the scientific spirit," which is a certain attitude of mind. Before attempting to state its relations to morality, I wish to indicate what it is by noting some of its characteristics.

1. *It is a spirit of inquiry.*—In our experience we encounter a vast body of established belief in reference to all important subjects. Nothing seems more evident than that this body of belief belongs to two categories: (1) the priceless result of generations of experience, and (2) heirloom rubbish. Toward this the scientific attitude is one of unprejudiced inquiry. It is not the spirit of iconoclasm, as some would believe, but an examination of the foundations of

¹ An address given before the Religious Education Association, at its Third Annual Convention, Boston, Mass., February 12-16, 1905.

belief. It must be evident that this spirit is directly opposed to intolerance, and that it can find no common ground with those who confidently, and perhaps somewhat violently, affirm that the present organization of society is as good as it can be; or that the past has discovered all that is best in education; or that the mission of religion is to conserve the past rather than to grow into the future. This is not the spirit of unrest, of discomfort, but the evidence of a mind whose every avenue is open to the approach of truth from every direction. I hasten to say that this beneficent result of scientific training does not come to all those who cultivate it, any more than is the Christ-like character developed in all those who profess Christianity. I regret to say that even some who bear great names in science have been as dogmatic as the most rampant theologian. But the dogmatic scientist and theologian are not to be taken as examples of the "peaceable fruits of righteousness," for the general ameliorating influence of religion and of science is none the less apparent. It is not the speech of the conspicuous few that is leavening the lump of human thought, but the quiet work of thousands of teachers. Scorn and ridicule of things that others hold in respect are not the attitude of science. Its function is to search for truth and to present it supported by such a convincing body of evidence that error will disappear without being attacked. It is the expulsive power of new knowledge that must be relied upon to unsettle ignorant opinion.

2. *It demands that there shall be no hiatus between an effect and its claimed cause, and that the cause claimed shall be adequate.*—It is in the laboratory that one first really appreciates how many factors must be taken into the count in considering any result, and what an element of uncertainty an unknown factor introduces. In the very simplest cases, where we have approximated certainty in the manipulation of factors to produce results, there is still lurking an element of chance, which simply means an unknown, and hence uncontrolled, factor. Even when the factors are well in hand, and we can combine them with reasonable certainty that the result will appear, we may be entirely wrong in our conclusion as to what in the combination has produced the result. For example, we have been changing the forms of certain plants at will, by exposing them to varying combinations of certain substances. It was perhaps natural to conclude

that the chemical structure of these substances is responsible for the result, and our prescription was narrowed to certain substances. Now, however, it is discovered that the results are not due to the chemical nature of the substances, but to a particular physical condition that is developed by their combination—a condition that may be developed by the combination of other substances, or of things that are not substances; so that our prescription is much enlarged.

There is a broad application here. For example, in education we are in danger of slavery to subjects. Having observed that certain ones may be used to produce certain results, we prescribe them as essential to the process, without taking into account the possibility that other subjects may produce similar results. In religion we are in danger of formulating some specific line of conduct as essential to the result, and of condemning those who do not adhere to it. That there may be many lines of approach to a given general condition is a hard lesson for mankind to learn.

If it is so difficult to get at the real factors of a simple result in the laboratory, and still more difficult to interpret the significance of factors when found, in what condition must we be in reference to the immensely more difficult and subtle problems which confront us in social organization, government, education, and religion?

The habit of considering only one factor, when perhaps scores are involved, indicates a very primitive and untrained condition of mind. It is fortunate when the leaders of opinion have got hold of one real factor. They may overdo it, and work damage by insisting upon some special form of action on account of it, but, so far as it goes, it is the truth. It is more apt to be the case, however, that the factor claimed holds no relation whatsoever to the result, and then the noxious weeds of demagoguery and charlatanism flourish. It is to such blindness that scientific training is slowly bringing a little glimmer of light, and when the world one day opens its eyes—and it will be well for it to open them very gradually—the old things will have passed away.

3. *It keeps one close to the facts.*—There seems to be abroad a notion that one may start with a single well-attested fact, and by some logical machinery construct an elaborate system and reach an authentic conclusion; much as the world has imagined that Cuvier could

do if a single bone were furnished him. The result is bad, even though the fact may have an unclouded title. But it too often happens that great superstructures have been reared upon a fact which is claimed rather than demonstrated. Facts are like stepping-stones; so long as one can get a reasonably close series of them, he can make some progress in a given direction, but when he steps beyond them, he flounders. As one travels away from a fact, its significance in any conclusion becomes more and more attenuated, until presently the vanishing-point is reached, like the rays of light from a candle. A fact is really influential only in its own immediate vicinity; but the whole structure of many a system lies in the region beyond the vanishing-point. Such "vain imaginings" are delightfully seductive to many people, whose life and conduct are even shaped by them. I have been amazed at the large development of this phase of emotional insanity, often passing under the name of "subtle thinking."

Science teaches that it is dangerous to stray away very far from the facts, and that the farther one strays away, the more dangerous it becomes, almost inevitably leading to self-deception.

The attitude of mind which training in science tends to cultivate has been illustrated sufficiently for our purpose. The moral aspects of it seem to me to be quite evident even in this partial analysis. It is open to the truth; it seeks for trustworthy evidence in reference to it; if necessary, it strives to strip off the husks of human opinion that it may get at the kernel; and when found it accepts it with ardor.

It may be well, however, to carry this subject forward to a more definite stage. Without pretending to any knowledge of the philosophy of morality, and still more ignorant of its terminology, I wish to indicate the attitude of the scientific mind toward those questions that affect personal and social conduct. The problem is to develop an effective man and an effective social order. From the standpoint of science, the various moral codes that have been formulated do not have any suggestion of commands. They are attempted statements of truth, which therefore must be tested. To take an extreme illustration: the set of moral principles contained in the Ten Commandments or in the Sermon on the Mount are not authoritative because they are commanded, but because they are true. Science would never raise the question whether the Ten Commandments or the Sermon

on the Mount are "binding" upon this nation or upon that, or upon this generation or upon some other; but simply whether they contain principles essential to a well-ordered individual or society; if so, they are true and *always* apply *everywhere*, just as does what we call the "law of gravitation." Newton has the reputation of having announced the law of gravitation, which science prefers to call a mode of operation rather than a "law;" but I presume that no one would say that this law is binding upon us because Newton announced it. The world, like the individual, grows in knowledge; and the childhood of the race was compelled to receive as commands what maturity recognizes as statements of eternal truth, infinitely more binding than any commands could be. There is no resenting truth and no quibbling about it; obedience is imperative. Moral truth, therefore, has the eternal and binding qualities of the truths of nature, which we call laws. I count this scientific attitude toward morality to be a distinct contribution toward its enforcement. I recognize freely that when this compelling power of knowledge is reinforced by the attraction of a noble emotion, there is a tremendous gain, but such reinforcement is the peculiar function of Christianity.

As a further illustration, showing how science reinforces religion as a teacher of morality, it may not be out of place to outline a scientific approach to the fundamentals of morality and even of Christianity—an approach that has proved satisfactory to many students trained in science. If a plant is to develop to the fullest possible vigor, it must establish effective relationships with its surroundings; otherwise it will be a failure. A leaf, to be strong and useful, must establish relations with the air and the sunshine. If a root seeks to establish the same relations, it will be a failure, but relations with the soil will make it strong and useful. This well-known biological law furnishes a clue to the problem of a strong and effective human life. It must establish effective relationships with its necessary environment.

The first step is to discover what are the dominating factors in the environment of a human life. At least two conspicuous factors are one's self and one's fellow-men. The problem, then, is to discover the most effective adjustment to these factors—an adjustment that means growth and the highest expression of the human powers; in other words, making the most of one's self.

The next step is to discover illustrations of the most effective lives, and at this point the perspective of the investigator comes into play. Compelled to consider the things that really make life worth the living, the things that are to give a quiet mind in the retrospect, it is rare that the most desirable lives are not chosen. Pressing the search for the completest exemplification of the most effective life, the lines all focus in the person of Jesus Christ, and this quite apart from any peculiar claim made for him. I have found absolute unanimity in the judgment that no life, in all that makes for strength and effectiveness, has approached that of Jesus Christ. It seems to be a human life at the limit of its capacity.

The next step in the investigation is to discover the solution offered by such a life to the problem of effective adjustment *of* one's self and *to* one's fellow-men. No questions of authenticity enter into such an investigation; for even if such a person never existed, the character is clearly drawn, and it stands as a definite conception of the finest possible man.

The investigator recognizes that he himself is a bundle of contradictory impulses, all of which cannot dominate, and some of which must. The grosser ones he recognizes off-hand as dangerous, and they are eliminated from the investigation. But among the finer ones, to choose that one to dominate which will make the most effective life is not so easy. An investigation of the personal character of Christ reveals the fact that he selected *unselfishness* to dominate—a selection that squarely holds in check the strongest natural impulse. The difficulty of this adjustment is unquestionable; no more difficult one could be suggested; but it means the difference between the sun pulling everything to itself, and the sun radiating light and energy in every direction. Testing the conclusion by the lives that have actually touched his own, the investigator finds abundant confirmation, for the effective lives are radiating centers of energy.

The problem of one's effective adjustment to his fellow-men is even more perplexing; but the model studied says clearly that the answer is *service*; not service that seeks a return, but service prompted by love. And again personal observation says that this is true.

Perhaps you are not aware of the strong appeal that love as a stimulus to right conduct makes to the scientific mind. The scientific

man is accustomed to stimuli and their responses, and he is fully alive to the fact that all that is finest in human conduct is a response to the stimulus of love. Therefore, in a religion whose basic principle is love, and whose God is the personification of infinite love, he recognizes an influence on personal character and on social order that must regenerate both, when fully applied.

Thus the effective adjustments are found, and the life that seeks to develop by selecting unselfishness and service as dominant principles is well started on its way toward religion.

I wish to remind you again that this is no fancy sketch of what might occur and probably never has occurred, but a very brief statement of the successive steps that have often been taken by men whose training demands an approach of this kind or none at all.

It is not clear to me that you will regard such results as of very large value, especially if you are not familiar with the scientific attitude of mind and the steps it must take to reach a conclusion that brings conviction and self-application. And yet it means to me that the scientific mind is open to moral truth, is incapable of being diverted from it by prejudice or second-hand opinion, and is compelled to accept and apply it when recognized. It is an attitude of mind peculiarly intolerant of sham or cant, and likely to brush aside unessentials that do not seem such to all; but this comes not only from its training, but is also one of the things it has learned to admire in the life of Jesus Christ. I am afraid that it is little interested in dogmatic theology, for the data, methods, and conclusions of theology are to it like a foreign tongue; but I make bold to say that it is immensely interested in morality and religion, and none appeals to it so strongly as do the morality and religion of Jesus Christ.

It is impossible to overestimate the effect of the scientific spirit, which dominates modern scholarship, upon that general attitude of mind that is making the world at large more sane and better able to repress unbalanced thinking. From this point of view, it would seem as though scholarship had at last entered upon its serious mission of curbing the irrelevant emotions of mankind, and of introducing that intellectual domination which must analyze problems to their ultimate factors and construct general systems of belief that are rational and effective.